Validation of 5 Stage-of-Change Measures for Parental Support of Healthy Eating and Activity


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Validation of 5 Stage-of-change Measures For Parental Support of Healthy Eating and Activity

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Pediatric Behavioral Informatics To Prevent Cancer
LEARNING OBJECTIVES

By the end of the journal club session, the participants will be able to:

1. Describe the steps used to develop a valid measures of stage of change
2. Understand how behavioral theory is used in the development of a measure such as the stages of change
3. Describe what internal consistency is and why it is important to measure development
4. Recognize how to select valid measures
BACKGROUND & STUDY JUSTIFICATION
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• Childhood overweight and obesity rates
• Practice recommendations put forth by the Expert Committee
• Urge providers to assess self-efficacy and readiness to change
• Lack of valid measures to assess parent readiness

RECOMMENDED OBESITY PREVENTION TOPICS

- Sugar-sweetened beverages
- Fruits and vegetables
- Screen-time
- Eating breakfast daily
- Fast food
- Family meals
- Portion size

- Exercise
- 100% fruit juice
- Food accessibility
- Snacks
- Parental role modeling (PM)


PURPOSE & RATIONALE

• Purpose: To develop valid measures that could help fill the gap but also be useful to practitioners.

• Aimed to develop measures that were:
  • Brief yet valid
  • Reliable
  • Seen as relevant
  • Consistent with Expert Committee topics
PURPOSE

• To develop a stage of change (SOC) measure for each of the following behaviors

1. Fruits & Vegetables (FV)
2. Television time (TV)
3. Physical Activity (PA)
4. Sugary Drinks (SD)
5. 100% Fruit Juice (FJ)
OPERATIONAL DEFINITION - STAGE OF CHANGE

• Conceptualized within a theory (Transtheoretical Model or TTM)
• A construct
• Stage of change construct is the temporal dimension of the TTM
• 5 stages of change (SOC)
  • Precontemplation (PC)
  • Contemplation (C)
  • Preparation (PR)
  • Action (A)
  • Maintenance (M)
ASSUMPTIONS

• Construct Validation Approach
• Assumptions
  • Observed variables are indicators of the construct (e.g., dietary behavior and SOC).
  • Validation depends on the relationship with other theoretical constructs (e.g. Self-efficacy)
  • Convergent validity is a form of construct validity that can provide some confirmation that the construct measures what it purports to measure.
HYPOTHESES

1. Parents in stages A and M report that their children engaged in healthier levels of the behavior than those in pre-action stages (PC, C, and PR).
2. Self-efficacy (SE) for meeting the criterion increase across the SOC
3. Measures of parental readiness, i.e., SOC and the readiness ladder, correspond to each other such that ladder scores increase across the SOC.
METHODS
PROCEDURES

• Measure development study
• Cross-sectional survey
• Parents recruited from Boston and surrounding area
• $20 gift card for completing a survey
• Boston University and UMass Boston IRB approved
MEASURES

STAGES OF CHANGE MEASURES
MEASURES

• Steps for developing the measures 1-5
• Scan the literature for existing
• Look for other measures for construct validation purposes
• Interview experts
• Develop drafts of the questions to assess face and content validity
• Cognitive interviews

The recommended amount of fruits and vegetables for a child is 5 servings per day. 5 servings fruits and vegetables is about 1 ½ cups of fruit and 2 cups of vegetables.
Do you currently provide 5 servings of fruits and vegetables to your child every day?

1. No, and I do not intend to provide 5 servings of fruits and vegetables in the next 6 months

2. No, but I am thinking about providing 5 servings of fruits and vegetables in the next 6 months

3. No, but I am planning to provide 5 servings of fruits and vegetables in the next 30 days

4. Yes, I have been providing 5 servings of fruits and vegetables for less than 6 months

5. Yes, I have been providing 5 servings of fruits and vegetables for 6 months or more
How ready are you to provide 5 servings of fruits and vegetables to your child each day? On a scale from 0 to 10, how ready are you.

<table>
<thead>
<tr>
<th>Not ready</th>
<th>Ready</th>
<th>Already</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Serve 5 a day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
SOC – PHYSICAL ACTIVITY (PA)

• Definition:
  • Moderate intensity physical activity is any activity that raises your child’s heart rate and breathing rate.
  • Moderate intensity physical activities include playing tag, kickball, hopscotch, jumping rope and other similar games, running, basketball, soccer, dancing and other energetic games or sports.
SOC - Physical Activity (PA)

Do you currently help your child get 1 hour of moderate intensity physical activity everyday?

a. No, I do not intend to help my child every day
b. No, but I am thinking about helping my child but not right now
c. No, but I am thinking about helping my child in the next month or so
d. Yes, I have recently started helping my child everyday
e. Yes, I have been helping my child everyday for 6 months or more

How ready are you to help your child get 1 hour of moderate intensity physical activity everyday? How ready you are on a scale from 0 to 10?

<table>
<thead>
<tr>
<th>Not Ready</th>
<th>Very Ready</th>
<th>Already Do It</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SOC – TELEVISION (TV) MEASURES

• **SOC:** Do you currently limit your child’s TV time to 2 hours or less per day.

• **Ladder:** How ready are you to limit the amount of TV your child watches to 2 hours or less per day?

• **Ladder:** It is recommended that a child not have a TV in his/her bedroom.
  • How ready are you to remove the TV from your child's bedroom? On a scale from 0 to 10, how ready are you?
SOC - SUGARY DRINKS (SD)

• 1 serving of sugary drinks is 8oz.
• Sugary drinks include regular soda, sport drinks, fruit drinks, punches, Kool-aid, Sunny-D, Tampico, Capri-sun, sweet teas, sugar flavored waters, and similar drinks with added sugar.

• SOC: Do you currently limit your child to 1 serving or less of sugary drinks per week?

• Ladder: How ready are you to limit your child to 1 serving or less of sugary drinks per week? On a scale from 0 to 10, how ready are you?
SOC- FRUIT JUICE (FJ)

• 100% fruit juice is pure juice with no added sugar, such as orange, apple, grape or Juicy Juice.
• 6 ounces is about a small juice glass.
• Do not include fruit drinks like Sunny-D, Tampico, Snapple, Capri-sun, Hi-C, lemonade, fruit punch, Kool-aid, or fruit juices with added sugar.

• SOC: Do you currently limit the amount of 100% fruit juice your child drinks to no more than 6 ounces each day?

• Ladder: How ready are you to limit your child to no more than 6 ounces of 100% fruit juice every day?
MEASURES

• Measures for construct validation
• Block Kids Screener (FFQ)1
• Amherst PA questionnaire2
• Parental Self-efficacy questionnaire3
• Readiness Ladder

STATISTICAL ANALYSIS

• Hypotheses were tested using analysis of variance (ANOVA) comparing
  1. Behavioral level across the stages of change
  2. Self-efficacy scores across the stages of change
  3. Readiness ladder across the stages of change
RESULTS
RESULTS

Table 1. Anthropometric and Socioeconomic Data for Parents and Their Children Aged 4-10 Years.
## RESULTS - DESCRIPTIVES

### Table 2. Distribution of Parents’ Responses to Stage-of-Change and Readiness Questions

<table>
<thead>
<tr>
<th>Behavioral Criterion</th>
<th>Stage of Change (%)</th>
<th>Readiness (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>PC</td>
</tr>
<tr>
<td>Fruits and vegetables</td>
<td>282</td>
<td>1.1</td>
</tr>
<tr>
<td>TV</td>
<td>278</td>
<td>10.4</td>
</tr>
<tr>
<td>TV Bed</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Physical activity</td>
<td>281</td>
<td>3.6</td>
</tr>
<tr>
<td>Sugary drinks</td>
<td>280</td>
<td>8.2</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>283</td>
<td>23.0</td>
</tr>
</tbody>
</table>
# Results – Hypothesis 1

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Variable</th>
<th>n</th>
<th>PC Mean</th>
<th>PC SD</th>
<th>C Mean</th>
<th>C SD</th>
<th>PR Mean</th>
<th>PR SD</th>
<th>A Mean</th>
<th>A SD</th>
<th>M Mean</th>
<th>M SD</th>
<th>F*</th>
<th>DF</th>
<th>Tukey–Kramer</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV consumed, cup equivalent</td>
<td></td>
<td>254</td>
<td>*</td>
<td>*</td>
<td>1.85</td>
<td>0.89</td>
<td>2.15</td>
<td>1.11</td>
<td>2.82</td>
<td>1.48</td>
<td>2.83</td>
<td>1.48</td>
<td>6.97</td>
<td>3,250</td>
<td>PC/C, PR &lt; M; PC/C &lt; A</td>
<td>.08</td>
</tr>
<tr>
<td>TV watched, min/d</td>
<td></td>
<td>274</td>
<td>188.13</td>
<td>80.15</td>
<td>207.81</td>
<td>104.04</td>
<td>203.78</td>
<td>145.09</td>
<td>165.07</td>
<td>109.69</td>
<td>106.74</td>
<td>85.95</td>
<td>11.27</td>
<td>4,269</td>
<td>PC, C, PR, A &gt; M</td>
<td>.14</td>
</tr>
<tr>
<td>PA, metabolic equivalent h/d</td>
<td></td>
<td>243</td>
<td>*</td>
<td>*</td>
<td>47.19</td>
<td>51.36</td>
<td>57.36</td>
<td>54.89</td>
<td>113.39</td>
<td>83.09</td>
<td>136.54</td>
<td>147.77</td>
<td>9.16</td>
<td>3,239</td>
<td>PC/C, PR &lt; A, M</td>
<td>.10</td>
</tr>
<tr>
<td>SD sugary beverage, total kcal/d</td>
<td></td>
<td>252</td>
<td>44.24</td>
<td>57.19</td>
<td>40.32</td>
<td>54.12</td>
<td>30.05</td>
<td>34.38</td>
<td>26.36</td>
<td>68.63</td>
<td>7.12</td>
<td>22.35</td>
<td>6.15</td>
<td>4,247</td>
<td>PC, C, PR &gt; M</td>
<td>.09</td>
</tr>
<tr>
<td>100% FJ, servings/d</td>
<td></td>
<td>282</td>
<td>1.95</td>
<td>.98</td>
<td>1.89</td>
<td>.91</td>
<td>1.88</td>
<td>.98</td>
<td>1.74</td>
<td>.88</td>
<td>.97</td>
<td>.76</td>
<td>13.17</td>
<td>4,277</td>
<td>PC, C, PR, A &gt; M</td>
<td>.16</td>
</tr>
</tbody>
</table>
## Hypothesis 1

### Variables

<table>
<thead>
<tr>
<th>Behavior</th>
<th>n</th>
<th>Tukey-Kramer</th>
<th>Eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV consumed (cup equiv)</td>
<td>254</td>
<td>PC/C, PR &lt; M; PC/C &lt; A</td>
<td>.08</td>
</tr>
<tr>
<td>TV watched (min/d)</td>
<td>274</td>
<td>PC, C, PR, A &gt; M</td>
<td>.14</td>
</tr>
<tr>
<td>PA (met hrs/d)</td>
<td>243</td>
<td>PC/C, PR &lt; A, M</td>
<td>.10</td>
</tr>
<tr>
<td>SD sugary beverage (total kcal/d)</td>
<td>252</td>
<td>PC, C, PR &gt; M</td>
<td>.09</td>
</tr>
<tr>
<td>100% FJ (servings/d)</td>
<td>282</td>
<td>PC, C, PR, A &gt; M</td>
<td>.16</td>
</tr>
</tbody>
</table>
RESULTS – HYPOTHESIS 2

Figure 2. Self-efficacy scores across the corresponding stages of change measures for the parent sample (n=281).
## RESULTS – HYPOTHESIS 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>PC Mean</th>
<th>SD</th>
<th>C Mean</th>
<th>SD</th>
<th>PR Mean</th>
<th>SD</th>
<th>A Mean</th>
<th>SD</th>
<th>M Mean</th>
<th>SD</th>
<th>F*</th>
<th>DF</th>
<th>Tukey-Kramer*a</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV to provide 5 servings/d</td>
<td>282</td>
<td>7.59</td>
<td>1.98</td>
<td>8.65</td>
<td>1.59</td>
<td>9.06</td>
<td>0.98</td>
<td>10.17</td>
<td>1.08</td>
<td>1.08</td>
<td>3.278</td>
<td>42.14</td>
<td>3.278</td>
<td>PC/C &lt; PR, A &lt; M</td>
<td>.31</td>
</tr>
<tr>
<td>TV to limit to 2 h/d</td>
<td>275</td>
<td>3.21</td>
<td>2.68</td>
<td>6.24</td>
<td>2.17</td>
<td>8.07</td>
<td>2.32</td>
<td>8.92</td>
<td>1.79</td>
<td>1.06</td>
<td>108.61</td>
<td>4.273</td>
<td>PC &lt; C &lt; PR, A &lt; M</td>
<td>.62</td>
<td></td>
</tr>
<tr>
<td>PA to help get 1 h/d</td>
<td>279</td>
<td>6.81</td>
<td>2.50</td>
<td>8.63</td>
<td>1.81</td>
<td>9.32</td>
<td>1.43</td>
<td>10.06</td>
<td>1.16</td>
<td>1.16</td>
<td>42.62</td>
<td>3.275</td>
<td>PC/C &lt; PR, A &lt; M</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>SD to limit to 1 servings/wk</td>
<td>278</td>
<td>4.46</td>
<td>3.20</td>
<td>6.28</td>
<td>2.55</td>
<td>7.68</td>
<td>2.35</td>
<td>9.03</td>
<td>1.66</td>
<td>1.53</td>
<td>56.03</td>
<td>4.273</td>
<td>PC, C, PR &lt; A &lt; M; PC &lt; PR</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td>FJ to limit to 4–6 oz/d</td>
<td>283</td>
<td>4.92</td>
<td>3.21</td>
<td>6.45</td>
<td>1.96</td>
<td>6.90</td>
<td>2.50</td>
<td>7.94</td>
<td>2.48</td>
<td>2.19</td>
<td>27.17</td>
<td>4.278</td>
<td>PC &lt; C, PR, A &lt; M; C &lt; A</td>
<td>.28</td>
<td></td>
</tr>
</tbody>
</table>

*a For within-subject contrasts only.
RESULTS – HYPOTHESIS 3
Readiness ladder response across the corresponding stages of change measure for the parent sample (n=283)
DISCUSSION & CONCLUSIONS
DISCUSSION

• There is evidence for the validity of the SOC measures
• Few studies that have validated parental SOC measures for healthful eating and activity behaviors
• Previous studies do not use a public health guideline criterion
Many collapse the stages so direct comparison between studies cannot be made

- studies combine stages, e.g., PC+C or A+M

Consistent with previous studies that examined PA SOC in adults

- 3 of 9 studies found that A and M were different from pre-action stages
- 5 of the 9 studies found that only M was different from the pre-action stages
LIMITATIONS

• Cross-sectional study
• Volunteer sample
• Self-reported measures used to measure behavior
CONSIDERATIONS AND NEXT STEPS

• Need objective measures of behaviors to further validate the SOC
• Although readiness ladder has some limitations, it could have excellent utility while providing some validity
• Examine or refine these measures for parents of children of different age groups (e.g., 2-4 years)
UTILITY & IMPLICATIONS

• Measures can be used to provide stage appropriate advice
• Dietitians, counselors and other health care providers
• Researchers
QUESTIONS?